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Nickel Downstreaming, Economic Added Value, And Indonesia Net Zero Emissions 2060

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This Research Report is Published by **Transisi Bersih**
Jakarta, 27 Juni 2024

Transisi Bersih

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EXECUTIVE SUMMARY

As a pledge to the Paris Agreement, the Indonesian government has launched a net zero emission (NZE) program in 2050 for the electricity sector and 2060 for other energy utilization. In various scenarios, Indonesia will limit the GHG (greenhouse gas) emissions in 2030, and then expected to continue to reduce to zero emissions in 2050 and 2060. Based on preliminary calculations from the Ministry of Energy and Mineral Resources (ESDM), the NZE program requires an investment of around 1 trillion US dollars.

Meanwhile, on the lookout for deindustrialization and increase economic added value, the Indonesian government launched a downstream mineral resources program. The Indonesian government officially banned the export of nickel ore on January 1, 2020, and bauxite on June 11, 2023. The export ban will extend to other mineral materials. The mineral downstream program is in principle a continuation of the Mineral and Coal Regulation (*UU Minerba*) Number 4 of 2009.

In the path downstream of the mineral sector, the Indonesian government uses a layered policy or "double policy", namely (1) prohibiting the export of raw materials and (2) providing incentives for investment in the smelter industry.

This double policy has a very strong effect. Nickel smelting capacity in Indonesia has increased 15 times in 7 years from 200 thousand tons of ferronickel in 2016 to 3.05 million tons in 2023 and will increase again to 5.57 million tons in the next few years, considering that currently there is a 2.52 million tons capacity on the pipeline. This double policy leads to over-investment.

Furthermore, over-investment causes over-production. Based on data from the United States Geological Survey (USGS), Indonesia's nickel production increased more than 15 times from 117 thousand tons in 2014 to 1.8 million tons in 2023. Production volume is expected to continue to increase considering that many smelters are still under construction.

Over-investment and over-production ultimately damaged the balance of the world nickel market. Supplies are plentiful and prices are falling. Economic added value, which is the main goal of downstream, is also on the verge of declining. Over-exploitation raises concern that Indonesia's nickel reserves to deplete more quickly.

Mineral downstreaming uses coal as the main energy source, thereby increasing the number of captive Coal Power Plants (CPPs used in industry) very rapidly from 1.4 GW in 2013 to 10.8 GW in 2023. Meanwhile, there are still 14.4 GW in the pipeline. Once the construction is completed,

the total capacity shall reach 25.2 GW. This amount is around 72% of all current on-grid CPP (34.8 GW). These captive CPPs are a huge threat to Indonesia's NZE program.

This research evaluates the two government policies above from economic and environmental perspectives, using 4 analyses, namely (1) coherence analysis, (2) economic added value analysis, (3) comparative advantage or competitiveness analysis, and (4) market structure analysis. With these 4 analyses, we are trying to develop an optimal economic model for downstreaming, which can minimize environmental damage on the one hand, and can achieve optimal economic added value on the other hand.

1. Downstream programs that use coal energy are not coherent with emission-free programs. It's like we drain the pool water, while at the same time we fill the pool with new water. Downstream programs can thwart NZE programs, and that would be costly. To harmonize these two programs, downstreaming must use clean energy. The use of clean energy and higher environmental standards will generally increase production costs and will increase the economic added value of the Indonesian nickel industry.
2. All costs incurred by foreign companies for domestic economic actors such as local employee salaries, (government) taxes, local subcontractor procurement costs, and other similar expenses, are added value to the domestic economy. It improves the welfare of the Indonesian people. The greater the costs spent by the company for local economic actors, the greater the economic added value as well as welfare for the surrounding community. Conversely, the smaller the costs spent by the company for local economic actors, the smaller the added economic value, as well as the less impact on welfare. Various downstream policies such as incentives for smelters, coal subsidies, cheap labor wages, low environmental standards, and so on actually reduce the economic added value of the smelter industry.
3. The Indonesian nickel industry has at least two natural comparative advantages (competitiveness). First, Indonesia is the dominant owner of world nickel reserves. 55 million tons (42%) of the world's 130 million tons of nickel reserves are in Indonesia. Based on the theory of comparative advantage, abundant resources are a natural competitive advantage where the country should be able to produce goods more efficiently than other countries. Secondly, Indonesia is an archipelagic country, so the mining industry's transportation costs are naturally more efficient than other countries. These two natural comparative advantages are enough to make Indonesian nickel products compete appropriately in the global market. There is no need for other competitiveness boosters. Other boosters, such as making cheap production costs by providing incentives, coal subsidies, cheap labor wages, low ESG (Environmental, Social and Governance) standards, and so on, actually reduce the added value of the national economy.

4. As the dominant natural resource owner, the Indonesian nickel industry forms a natural monopoly. Naturally, the Indonesian government can control the world supply and price of nickel to obtain optimal benefits for the nation's welfare. With this natural monopoly position, the Indonesian nickel industry actually does not need incentives, dirty energy (coal), cheap labor wages, and low ESG standards. If Indonesia removes incentives, uses clean energy, increases labor wages, raises environmental and ESG standards in general, which then results in an increase in nickel production costs, then the global nickel market will adjust itself.

Based on the 4 analyzes above, Indonesia can actually create a downstreaming model that is environmentally friendly (green downstreaming), with a high standard, and provides optimal economic added value for the national economy.

To achieve this optimal downstreaming model, we recommend the 5 (*five*) below :

1. Revoke all nickel smelter investment incentives, both direct and indirect, such as tax holidays, royalty discounts, import duty exemptions, coal subsidies, the use of dirty energy, cheap labor wages, and other incentives. The government needs to return to normal policies to restore balance to the global nickel market and increase the added value of the national economy. As the dominant natural resource owner, the Indonesian government does not need a nickel investment booster.
2. To improve ESG standards including a ban on the use of fossil energy. Increasing ESG standards can increase production costs and increase the economic added value of the nickel industry. By increasing ESG standards, Indonesia can get two things at once, firstly minimal environmental damage and secondly optimal economic-added value
3. If the two recommendations above are not enough to restore market balance, then Indonesia can add export taxes, export tariffs, or royalties. As the dominant owner of nickel deposits, the Indonesian government does not need an investment booster, even more, Indonesia can get an investment "premium", if necessary.
4. As a critical natural resource and non-renewable, nickel extraction must use the "austerity principle". The Indonesian government needs to treat nickel with high value and only use it for products that are essential and high in economic value.
5. Enhance nickel downstreaming into nickel industrialization. To increase economic added value at an advanced stage, the government needs to enhance downstreaming into industrialization by increasing products from ferronickel and mattes to semi-finished metal or even finished goods.

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1 Introduction

By virtue of the Minister of Energy and Mineral Resources Regulations Number 25 of 2018, Number 11 of 2019, and Number 17 of 2020, the Indonesian government officially prohibits the export of nickel ore (grade < 1.7%) on January 1, 2020, and bauxite on June 11, 2023. The government also plans to expand this ban to other critical minerals. To ship out the mineral products from Indonesia, economic actors must build a refining industry on Indonesian soil. This export ban caused the European Union to sue Indonesia at the WTO. Meanwhile, the Indonesian government remains adamant in its stance.

The ban on exports of mineral ore aims to increase the added value of the refining (smelting) industry in Indonesia. Based on the National Industrial Development Master Plan (RIPIN) 2015-2035 (Government Regulation No. 14 of 2015), Indonesia will build downstream industries to increase added value in three sectors, namely: (1) agriculture and plantations, (2) mineral resources, and (3) oil and gas. So, this export ban is part of a bigger plan for upstream industrial development to increase industrial added value.

It should be noted that in the last 20 years, premature de-industrialization has occurred in various sectors in Indonesia. Data from the Statistical Bureau/BPS (2024) stated that the added value of the manufacturing industry in gross domestic product (GDP) has shown a consistent decline from 22.04% in 2010 to 21.54% in 2015, then 20.61% in 2020, and 20.39% in 2023. Meanwhile, according to a report issued by LPEM (2024), the ratio of manufacturing to GDP also decreased consistently from an average of 27.93% in 2000-2004, to 26.05% in 2004-2009, then 22.42% in 2009-2014, 22.02% in 2014- 2019, and 21.15% in 2019-2023. Two young economists, Islami & Hastiadi (2020), stated that Indonesia experienced premature and negative de-industrialization in various industries, including those with high added value, which caused a slowdown in economic growth.

To fight premature deindustrialization and to exhibit economic growth, the government is developing downstream industries. Considering the intense downstreaming notion; in our perspective, the downstream industry will become the main keyword in the direction of economic and development policy in Indonesia, in one or several periods ahead.

1.1 Downstreaming Nickel and other Minerals

In implementing the downstream nickel (and other mineral) program, the Indonesian government uses a double policy, namely (1) prohibiting the export of raw materials as mentioned above, and (2) providing incentives for investment in the smelter industry. This multi-layered policy aims to stimulate the development of the smelter industry in Indonesia.

In general, there are two forms of incentives, namely direct and indirect. The direct incentive is in the form of a tax holiday or income tax exemption (corporate income tax) for 5 to 20 years. According to Septian Hario Seto, Deputy for Investment and Mining at the Coordinating Ministry for Maritime Affairs and Fisheries, the two largest foreign investors get a 20-year tax exemption, while the others get between 5 – 15 years (CNN Indonesia, 2023). Another form of direct incentive is a royalty discount, namely investors who have a Mining Business License (IUP/*Ijin Usaha Pertambangan*) and smelters only need to pay a 2% rate, while the normal rate is 10% (Regulation /PP No. 26 of 2022). The government also provides coal subsidies for the smelter industry by paying only $70 per metric ton from the current market price of between $200 - $300 per metric ton (Basri, 2024). Then the government pays the rest. The government also waives import duties for capital goods in the nickel industry.

There are various forms of indirect incentives. In the smelter industry, it is shown by permission to use the cheapest and dirtiest fossil energy, namely coal, as stated in Presidential Decree No. 112 of 2022. In principle, the Presidential Decree prohibits the construction of new CPPs (Coal Power Plants) in Indonesia, except for strategic and high-value-added industries, including the downstream industry.

Another form of indirect incentive is that investors enjoy a guarantee that workers' wages will not increase. The *UU Cipta Kerja* (Job Creation Law) issued in 2020, the minimum wage for workers may only increase following inflation (Law No. 11 of 2020). This means that the minimum wage is stagnant or only following inflation so that it does not increase the operational costs of downstream industries. The government also provides various environmental standard waivers for the smelter industry.

This double policy bestows a double push effect on smelter investment in Indonesia, especially nickel. Based on notes Databox (2016) Nickel smelting capacity in Indonesia has increased 15 times in 7 years from 200 thousand tons of ferronickel in 2016 to 3.05 million tons in 2023. This production capacity will continue to increase to 5.57 million tons in the next few years, considering that currently there are 2.52 million tons of capacity on the pipeline (Parapat & Hasan, 2023, p. 10).

The rapid increase in smelter capacity in recent years has increased production and export rapidly. According to the Statistical Bureau (BPS data), exports of nickel and nickel products increased almost 14 times from 91.5 thousand tons in 2019 to 1.26 million tons in 2023. The rapid increase in nickel production and export from Indonesia has caused Indonesia to become the main global nickel producer. In 2022 and 2023, almost half of the world's nickel was produced in Indonesia (Annur, 2024). This has a direct effect on global nickel prices. From 2016 to 2021 world nickel prices tend to increase but in 2022 a downward trend begins to occur.

Since almost all smelters use coal as their main energy, there has been a very rapid increase in the number of captive CPPs in recent years. Based on notes Parapat & Hasan (2023, pp. 4-5), the number of captive CPPs increased rapidly from 1.4 GW in 2013 to 10.8 GW in 2023. Of this amount, 8.2 GW (76%) was used in the metal industry and 7.3 GW of them (67%) operated as a nickel smelter.

Now, here's the big picture. The double policy regarding nickel downstream has led to a very strong push for nickel smelter investment in Indonesia. The number of new smelter construction in Indonesia is large, even excessive. Excessive policies cause excessive investment (over-investment). When the new smelters are in operation, Indonesia's nickel production shall increase rapidly (over production) and dominates the world market. Global nickel supplies become abundant, and eventually, as the market laws dictate, prices will fall. Meanwhile, along with the operation of new smelters, the number of captive CPPs and consequently emissions also increase rapidly. In short, this double policy causes two negative impacts at once, a double blow, namely a decrease in global nickel prices (as well as a decrease in economic added value) and an increase in emissions.

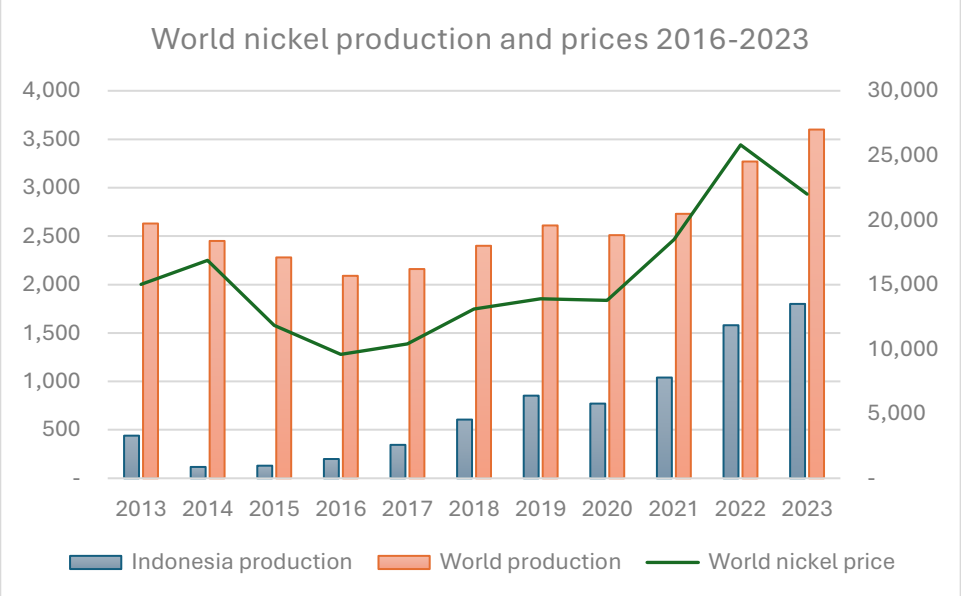

Figure 1 Production and Price of The World Nickel 2016 – 2023. Data source: USGS.

Responding to the excess nickel smelter capacity, the Indonesian Nickel Miners Association (APNI), which is also supported by the Parliament, proposed limiting the number of new smelters (AP3I, 2021; APNI, 2021). Through its press release, the government also officially stated that it would limit permits for building new smelters (Kementerian ESDM, 2023).

Furthermore, the government also plans to revoke tax holiday incentives for (new) nickel smelters, the pyrometallurgical rotary kiln-electric furnace (RKEF) type (Wahyudi, 2023).

1.2 Indonesia Net Zero Emissions in 2060

At the G20 Summit in Bali in 2022, Indonesia committed to achieving the target of zero emissions (net zero emissions - NZE) by 2050 for the electricity sector and 2060 for other energy utilization. This commitment is part of the implementation of Law Number 16 of 2016, concerning the Ratification of the Paris Agreement to the United Nations Framework Convention on Climate Change. This commitment is a form of Indonesia's seriousness to be actively involved in global action to mitigate climate change so that the earth's temperature does not exceed the critical limit of increasing 1.5 degrees Celsius, as mandated by the Paris Agreement.

At the same time, the Indonesian Government together with the International Partner Group (IPG) led by the United States and Japan then launched the Just Energy Transition Partnership Indonesia (JETP Indonesia) program. JETP Indonesia mobilizes funding of 20 billion US dollars, a small portion of which will be in the form of grants and the remainder in the form of commercial and non-commercial loans. Apart from fulfilling its national contribution commitment (NDC), Indonesia is also determined to build a low-emission economy and break the link between industry and emissions. It is hoped that JETP will be the first concrete step that triggers further actions.

The Indonesian government has also made a long-term energy transition plan. Based on the press release by the Ministry of Energy and Mineral Resources (2021), the government will encourage the use of electric stoves for 2 million households, and build a smart electricity network (smart grid) by 2024. Then, in 2027, the government will ban LPG exports and prioritize domestic use, build a gas network for 10 million households, target 2 million units of electric cars and 13 million units of electric motorbikes, as well as encourage the use of dimethyl ether. The government also plans to carry out early retirement of subcritical CPP in 2031 and increase the Renewable Energy (EBT) mix to 71% in 2040, 87% in 2050, and 100% in 2060. In the latest Nationally Determined Contribution (NDC) document, Indonesia has raised its emission reduction target to 31.89% in 2030, or 43.20% given international support (Republic of Indonesia, 2022). To realize this ambitious goal, until 2030, Indonesia needs investment worth at least 281 billion US dollars (Boer, et al., 2021).

Based on the Ministerial press release (2024), currently, the government is revising the National Energy Policy (KEN) and the General National Energy Plan (RUEN) which cover all energy policies in Indonesia so that they are in line with the 2060 NDC target. With the revision of the KEN and RUEN, the 2060 emission-free plan will become a program that is integrated, cross-sectoral, and binding all elements.

Meanwhile, in November 2023, JETP Indonesia, which is an NZE acceleration program in the electricity sector, issued a long-term scenario and plan in the form of a Comprehensive Investment Policy Plan (CIPP). In the CIPP scenario, it is stated that peak emissions from Indonesia's electricity sector should be no more than 290 million tons of CO2 in 2030 (down from BAU of 357 million tons) and will continue to decline to zero in 2050. To achieve this target, Indonesia needs to build infrastructure and transmissions of clean energy. Therefore, the installed capacity will reach 470 GW in 2050, of which 90% comes from renewable energy.

The total investment required for the energy transition in the electricity sector until 2050 is about 652 billion US dollars or around 10,000 trillion rupiah (JETP Indonesia, 2023, pp. 50-56). According to the Ministry of Energy and Mineral Resources's calculations, Indonesia requires an overall energy transition investment is about 1 trillion US dollars until 2060 (ESDM, 2022). Meanwhile, based on IESR calculations, the investment need for energy transition in Indonesia is even greater, namely 1,281 billion US dollars by 2050[1] (IESR, 2021). Considering the large funding needs for the energy transition, Indonesia welcomes cooperation and funding from all corners, including China via the Belt and Road Initiative (BRI) program (Simanjuntak & Hasjanah, 2023).

1.3 The Objective

This policy paper aims to analyze and evaluate two government policies regarding downstreaming and decarbonization from an economic and environmental perspective.

First, coherence analysis. A policy or program in the economy is considered coherent if it supports each other or at least does not interfere with each other. On the other hand, economic policies are considered incoherent if they interfere with each other, negate each other, and neutralize each other (Rahman, Mahardika, Putri, & Rosifah, 2024). We consider Indonesia's emission-free policy and the downstream industry to be incoherent. The nickel and other mineral downstream programs use coal as the main energy which can disrupt, counteract, and neutralize Indonesia's NZE program.

Second, analysis of economic added value. In this analysis, we found that there are two ways to increase economic added value in the downstream industry. First, develop the product up to the finished product. Downstreaming itself, in principle, is increasing added value towards finished products. And secondly, working on the activities and costs on the production side. It should be noted that from an economic perspective, production costs in the downstream industry will become income for economic agents in the entire downstream industry ecosystem. Therefore, increased activity and increased costs generally increase added value and ultimately encourage economic growth. The are two ways to achieve competitiveness. The first is to produce cheap and

[1] IESR establish a modeling for Indonesia's decarbonization until 2050 to be in line with the 1.5 C target in the Paris Agreement.

environmentally unfriendly products. We found that this way could reduce economic added value. The other option is to produce more expensive and environmentally friendly products. And we found that this way could increase economic added value.

Third, comparative advantage analysis. In the analysis of comparative advantage or trade competitiveness, again there are two ways to choose, namely (1) the cheap and environmentally unfriendly products and (2) more expensive and environmentally friendly products. The first option relies on low prices as a comparative advantage by creating a cheap production system and low standards, including the use of dirty energy (coal). The second option makes environmental friendliness a comparative advantage by creating an environmentally friendly production system with high standards including the use of clean energy. As we mentioned above, we found that the second option can increase economic added value better than the first option.

Fourth, market structure analysis. In the market structure analysis, we found that Indonesia is the dominant owner of world nickel reserves and therefore occupies a natural monopoly position. With this natural monopoly position, Indonesia can use the principle of "permanent sovereignty over natural resources" (UN, 1962) to minimize the impact of environmental damage and optimize economic added value at once. The latest data states that Indonesia's nickel reserves have reached 55 million metric tons (USGS, 2024), or around 42.3% of world reserves. This natural monopoly position allows the Indonesian government to control the supply and ultimately the world price of nickel to obtain optimal benefits for its national interest (optimal community welfare, added value, and economic growth).

From the analysis of coherence, economic added value, comparative advantage, and market structure, we formulate recommendations to reach coherency between the two policies and to provide optimal impacts for both economical and environmental sustainability.

2 Analysis on Economic Policies

2.1 No Coherency with the Net Zero Emissions Plan

Based on the economic and justice standards issued by Transisi Bersih (Rahman, Mahardika, Putri, & Rosifah, 2024), one of the critical factors in any program to achieve zero emissions is coherence. An emissions-free program will only be effective if it is coherent with other programs and vis versa. Incoherent programs can counteract and neutralize each other, making them ineffective and even failing.

Emission-free and new coal power plant

One example of a program that is not coherent with the emission-free program is the continued operation of new CPPs in the downstream industry. The emission-free program seeks

to reduce emissions, reduce the use of fossil energy, and replace it with emission-free renewable energy sources. Meanwhile, the downstream industry uses the dirtiest fossil energy, coal, and emits large amounts of new emissions. This is the same as draining the water in the pool while at the same time also filling it with more water. These two programs negate each other and make the costs and resources spent in vain. Thousands to tens of thousands of trillions of costs spent on the NZE program will become ineffective.

As stated above, by the end of 2023, the number of captive CPPs reached 10.8 GW of which 7.3 GW (67%) operates in the nickel downstream industry. Apart from that, there are still CPPs in the pipeline, amounting to 14.4 GW (Parapat & Hasan, 2023). When all the planned plants are constructed, the total capacity of captive CPP will reach 25.2 GW or around 72% of all on-grid CPP (34.8 GW) operating in Indonesia at the end of 2023. The capacity of this captive CPP is very large. It is indeed large, almost as large as the number of CPPs currently operating. When Indonesia succeeds in implementing the electricity emissions-free program according to schedule and targets, for example, Indonesia will still not free from carbon emissions because there will still be captive power plants in operation, with capacity was almost the same as the capacity currently operating today. A captive CPP would be the big hole that could overturn Indonesia's carbon emission-free program.

This incongruity is actually found in Presidential Decree Number 112 of 2022, which is the foundation for the energy transition in Indonesia. This Presidential Decree on "Accelerating the Development of Renewable Energy for the Supply of Electric Power" is principally aimed at reducing carbon emissions in Indonesia. This presidential regulation generally prohibits the construction of new CPPs throughout Indonesia and encourages the development of renewable energy, and even encourages early retirement of CPPs. However, in article 3 there is an "exception" that allows the construction of new CPPs for strategic industries, one of which is the downstream industry. Furthermore, this presidential regulation also allows the construction of new CPPs if, within the next 10 years, the operator commits to reducing the CPP's emissions by (at least) 35%. Hence, this presidential regulation is exactly the act of "draining pools on one end, but also allowing it to be re-filled with new water". As an extension of this presidential regulation, the Financial Services Authority (OJK) also includes PLTUs that meet the two criteria above as a "green taxonomy", so they are entitled to receive sustainable funding. (Parapat & Hasan, 2023, p. 19).

Sample case: *Early closure of CPPs along with the construction of new CPPs*

One clear example of the incongruity in this presidential regulation is the policy of CPPs' early retirement and yet the construction continuation of new CPPs. To highlight that the CPPs' early retirement is the implementation of article 3 paragraph 3 point b. Meanwhile, the construction of new CPPs for the downstream industry is an implementation of article 3 paragraph 4 point b.

Both actions have the same regulatory basis. When we close the 1 GW CPP and then build a new 1 GW CPP, the two programs will only neutralize each other. The emission reduction effect, expected from the already expensive early retirement of the CPP, will be lost.

To eliminate this incoherency, we recommend that the government "prohibit the construction of CPPs as a whole and without exception". As we will explain below, by eliminating coal-fired power plants in the nickel and other mineral downstream industry, we can increase the economic added value of that industry. In this way, we can achieve two goals at once, namely getting better economic added value and at the same time improving the quality of the environment, including achieving the vision of an emission-free Indonesia.

Apart from being a heat source, in the primary metal smelting industry (from ore to metal), coke and coal also function as efficient "reducing agents" in the chemical process of converting ore to metal (pig iron). Several technologies can replace coke and coal with other elements such as gas with various levels of efficiency (Agora Industry, 2023). We limit ourselves from the technical realm and focus on the general principles, instead. In conditions where sufficient alternative technology is not yet available, fossil energy or elements can still be used, but in very limited quantities. However, once alternative technologies become feasible, fossils should be banned completely.

Investment incentives and restrictions

Another striking form of misalignment is incentives to attract investment and restrictions at the same time. As mentioned above; to encourage downstream investment and attract foreign investors, the government provides direct incentives such as tax holidays and royalty discounts. The government also provides indirect incentives such as guarantees that workers' wages will not increase, the use of cheap dirty energy, namely coal, and so on.

There are a lot of research results that prove, both theoretically and empirically, that incentives can attract investment, especially foreign direct investment (FDI). Cleeve (2008) for example, finds that tax exemptions are the most effective instrument in attracting FDI in Sub-Saharan African countries. Meanwhile, Van-Parys & James (2010) also found the same thing, that tax exemptions were effective in attracting FDI in African CFA Franc countries (African countries that were former French colonies). They also added that other instruments such as investor protection and simplicity of the tax system boost FDI.

However, tax exemption incentives and equivalents are expensive instruments. By exempting taxes and other royalties, the government will lose a very important source of revenue. Meanwhile, developing countries generally really need this revenue to build infrastructure. Based

on the findings Wells, Allen, Morisset, & Pirnia (2001), The provision of tax incentives in Indonesia between 1967-1995 has significantly reduced the government's potential tax revenue. According to their calculations, this loss of potential government revenue is greater than the benefit of increased investment in that period. They concluded that the costs of providing tax incentives in Indonesia during the New Order era exceeded the benefits.

Another important cost of providing incentives is the increase in profits flowing abroad and ultimately making a country's current account (CA) balance negative and at the same time drying up foreign exchange reserves. Please note that tax exemptions reduce government income and increase investor income. If the investor is foreign, then this will increase the number of profits (foreign investors) flowing abroad and reduce the foreign exchange reserves of the country concerned. According to (Jansen, 1995), FDI increases incoming capital (capital inflow) at the initial stage but actually increases capital outflow (capital outflow) at a later stage when the FDI brings profits back to the country of origin. And the number of profits flowing abroad is fairly significant and over a very long period of time, as long as the FDI operates. UNCTAD (1999) and UNCTAD (2002) reports also found the same pattern in Asian and Latin American countries and even in China. According to these two reports, in the long term, FDI will channel profits abroad and make the current account balances of these countries tend to be negative. Tax exemption incentives and the like, especially for foreign investors, will increase foreign profits flowing abroad, making the current account negative and reducing foreign exchange reserves.

As mentioned above, this double policy of banning exports of raw materials and providing incentives is very effective in boosting nickel smelter investment in Indonesia. Ferronickel production capacity in Indonesia has increased rapidly from 200 thousand tons per year in 2016 to 3 million tons per year at the end of 2023. This capacity will continue to increase to 5 million tons in the next few years after all the smelters under construction are completed. Nickel production from Indonesia increased rapidly from 93 thousand tons in 2020 to 1.26 million tons in 2023. Nickel production from Indonesia dominates the global market and reverses the downward trend in global prices. With this very large and continuously increasing production capacity, the Association of Indonesian Mining Experts (Perhapi), which is also supported by various parties, is starting to worry about faster depletion of national nickel reserves (Muliawati, 2023; Shiddiq, 2023). To control the amount of production, the government will limit permits for building new smelters (Kementerian ESDM, 2023).

Providing investment incentives and limiting investment are two incoherent programs, that counteract, and neutralize each other. As mentioned above, providing incentives to attract investment is expensive. It causes the loss of potential government tax and royalty revenues (fiscal costs) and increases the profits flowing abroad (balance of payment costs). This expensive policy

was then neutralized by investment restrictions. This is the same as if we hit the gas and brake at the same time. A waste of energy and resources in vain.

Therefore, we recommend that the government remove incentives to put a brake on nickel smelter investment. Removing these incentives can at least reduce fiscal costs and balance of payment costs. And if this is not enough to put a brake on investment, then the government needs to raise ESG standards for new investments and even add new taxes or tariffs. We will explain these three recommendations below in more detail.

2.2 Economic Added Value

Economic added value from a business and economic perspective is slightly different. In business, economic added value is any profit or benefit enjoyed by shareholders, or anything added to the value of the company, such as net profit. As for economics, added value is a benefit for all economic agents, starting from shareholders (net profit), employees (salaries), government (taxes), funding providers (interest), subcontractors and vendors (procurement costs), and all costs, which flows to other economic agents. So, added value in economics is broader, including company profits and the income of all economic actors who work in the company. The sum of all this added value is then called a country's income or gross domestic product (GDP) (Landefeld, Seskin, & Fraumeni, 2008).

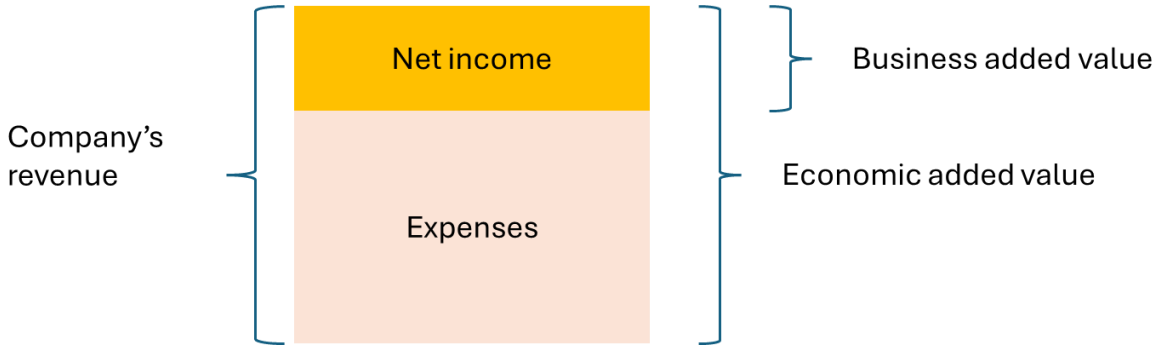

Figure 2 Illustration of Business and Economic Added Value

Thus, economic value added contributes more to a country's GDP than business value added, especially in export-oriented foreign companies. The reason is that economic-added value flows to all economic actors. Meanwhile, business-added value only flows to company owners who are foreigners. In economic perspective, the costs incurred by a company are more important than the company's own profits. The greater the costs incurred by a company, the greater the income and money flowing into the ecosystem.

In the international context, the added value of smelter companies is divided into two, namely added value that flows abroad (foreign) and that flows domestically. The added value that flows abroad belongs to foreign economic actors and does not revive the national economy. Meanwhile, the added value that flows within the country revives and drives national economic activity.

Economic Added Value	**Foreign (A)**	**Domestic (B)**
Profit for the foreign investor	v	
Expenses for foreign vendors	v	
Salary of foreign workers transferred to their respective hometown	v	
Salary of foreign workers spent domestically (in host country)		v
Expenses for local vendor		v
Local employee's salary		v
Tax and other state retribution		v

Figure 3 Domestic and foreign economic added value

The greater the portion of a company's profits and costs that flows abroad (column A), the greater the added economic value of the industry abroad, while the smaller the added value to the domestic economy. The company's contribution to national welfare is getting smaller. On the other hand, the greater the portion of costs that flows domestically (column B), the greater the added value of the industry to the domestic economy. The company's contribution to national welfare is also increasing.

By using an added value perspective, we can analyze the impact of government policies in the downstream industry in increasing economic added value, economic growth, national income, and community welfare.

First, various kinds of incentives as mentioned in Subchapter 1.1 directly reduce (potential) government income, thereby reducing the added value of the domestic economy. The greater the incentives provided by the government to foreign investors, the greater the added value that flows abroad, and (conversely) the smaller the added value at home and its impact on local and national economic activity. Then other indirect incentives such as cheap labor wages and low ESG standards cause domestic production costs to be relatively cheap. This also indirectly reduces the added value of downstream industries to the national economy.

Third, as explained above, excessive incentives cause over-investment and ultimately over-production and ultimately reduce global nickel prices. Over supply and falling global prices

will make smelter companies try to reduce costs, thereby further reducing the added value of the national economy.

From the analysis of economic added value, the current nickel downstream policy actually reduces the added value of the economy itself. To fix this, we recommend removing all direct and indirect incentives. We also recommend all policies that could increase nickel production costs such as increases in environmental standards, including the use of clean energy, increases in labor wages, increases in safety standards, and increases in ESG in general. The increase in standards will generally increase nickel production costs and ultimately increase the added value of the national economy.

Sample Case

1. The Paradox of Trade and Indonesia's Foreign Exchange Reserves

At the end of 2022, many people witness a paradox in Indonesia's trade sector and foreign exchange reserves. At that time, Indonesia's trade experienced a consecutive surplus for 32 months and recorded the highest cumulative surplus record in history. The trade surplus in 2022 alone will reach 55 billion US dollars. However, behind this large trade surplus, foreign exchange reserves actually decreased (Putri, 2023).

The large incentives for foreign investors in the downstream industry (and other industries as well) are one of the factors that cause this paradox. Providing these incentives actually increases the profits of foreign investors that flow abroad, which ultimately reduces foreign exchange reserves. The more the government provides incentives to foreign investors, the smaller the added value of the national economy and the smaller the foreign exchange reserves will be in the long term.

2. The Paradox Consumption and GRDP

Morowali Regency, Central Sulawesi, is one of the centers of the nickel downstream industry in Indonesia. In the last 13 years, the smelter industry has significantly boosted the region's economy. Based on statistical bureau (BPS) data, from 2010 – 2023, the Gross Regional Domestic Product (GRDP) of Morowali Regency increased 107 times. But consumption, in the same period, only rose 2.2 times. For the wider area, Central Sulawesi Province, GRDP increased 16.6 times, while consumption only increased 1.8 times (Basri, 2024). There is a very wide gap between the increase in GRDP/GDP and consumption.

In the economy, an increase in income is generally followed by an increase in consumption. If a region's income rises rapidly while consumption does not, it is likely that this income flows outside the region or even abroad. It is important to note that GRDP counts all the income of economic agents in an area, including those of foreigners. The large gap in the increase

in GRDP and consumption is an indicator of the amount of income that flows abroad or outside the region and does not provide added economic value for Morowali regency and its surroundings.

1. *The Cheap Indonesia Nickel and The Expensive Australian Nickel*

Australia is the owner of the second-largest nickel reserves after Indonesia. In terms of reserves, Australia is Indonesia's closest competitor. Just like Indonesia, Australia generally also produces and exports ore and concentrate. However, the selling price of Australian nickel is more expensive than in Indonesia. The following is a graph comparing the export value per metric ton of Indonesian and Australian nickel products.

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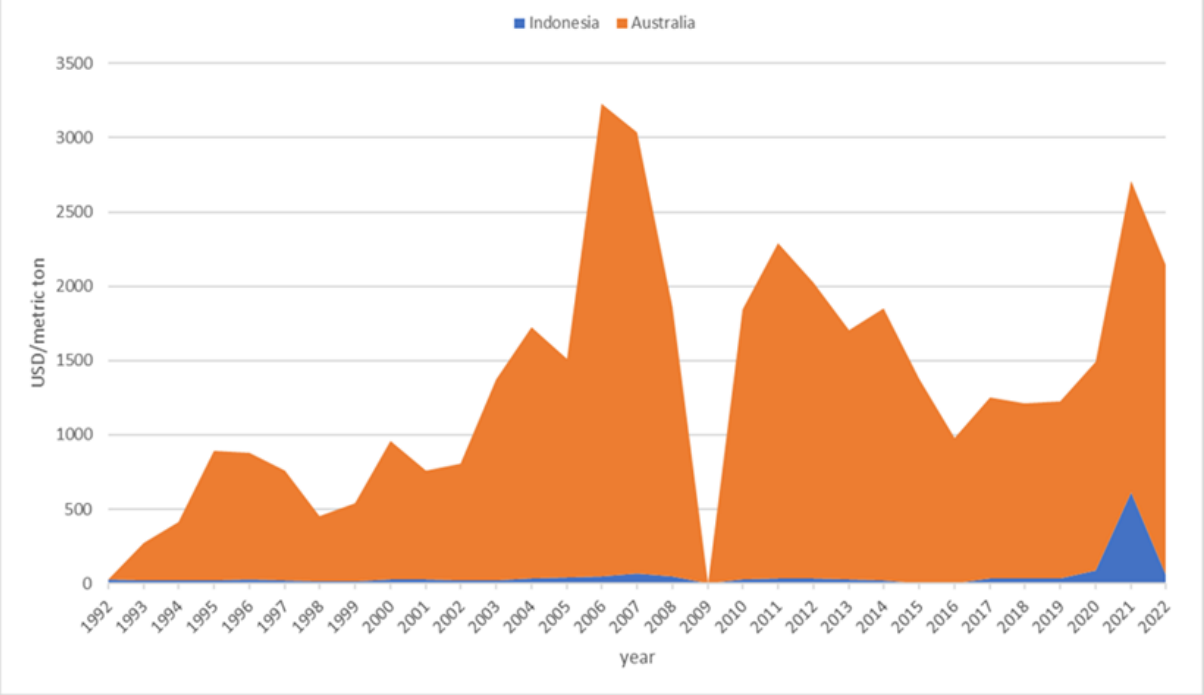

Figure 4 Comparative data on Export value per volume of Nickel ore and concentrate, from Australia and Indonesia, (processed from: WITS (World Integrated Trade Solution) https://wits.worldbank.org)

The graph above shows that Australia's export value per metric ton of nickel is significantly greater than Indonesia's, even after Indonesia carries out downstreaming in 2021. At that time, Indonesia's nickel exports were dominated by ferronickel and mattes. At that time, Indonesia's nickel export value was around USD 600 per metric ton while Australia's was around USD 2,700 per metric ton. This comparison raises the question, why does Australia obtain much greater added value than Indonesia when the products sold are ores and concentrates?

Differences in production systems and ESG in general in the two countries may explain these differences.

First, Indonesia has laterite-type mineral deposits which are on the ground surface and can be mined at relatively cheaper costs, while Australia has dominant reserves of the sulfide type which must be mined by underground drilling at a more expensive cost. Second, the laterite deposit type has a lower nickel concentrate content, below 2 or 3%, compared to sulfide. This makes sulphide priced higher with reference to the LME exchange which sells commodities with purity of up to 98-99%. Third, Australia generally has a much higher level of ESG practices.

As stated by the Australian Department of Science and Industrial Resources in February, the ESG applied to Australian mines is one of the best in the world so mineral production is believed to be more sustainable and ethical than other countries (Ministers for the DISR, 2024). ESG referred to in the statement is described as work environment security and worker safety, as well as protection for the environment. These two aspects of ESG do not exist in Indonesia due to the relaxation of environmental standard regulations and labor laws which only protect the interests of entrepreneurs.

The world nickel reference price has decreased due to Indonesian exports being sold at much lower prices, making it difficult for Australia to market its products. As a result, since the end of 2023, several Australian nickel mines have stopped or reduced production capacity (Ministers for the DISR, 2024).

The Australian government has also included nickel on the list of critical minerals and is preparing a fund injection. They are also working to ensure that Australian nickel products can be priced higher because they have good ESG standards (Ministers for the DISR, 2024) by negotiating with the United States, Canada, and the European Union. Economic observers call this diversification of "green" products from "dirty" ones which should be applied on a global scale (Russel, 2024). These efforts resulted in the signing of the Australia – European Union MoU, in May, which contains a bilateral agreement on sustainable critical minerals that will allow for the intended price diversification in the future (European Commission, 2024) This will also open the markets for sustainable critical mineral commodities with high ESG standards (DISR, 2024).

The Australian nickel industry shows that economic added value can be high even in the ore and concentrate phase by implementing more advanced production systems and high ESG standards. The added value will be even higher if combined with product improvements.

Product improvement

Increasing economic added value can also be in the form of advancing products from mineral ores to concentrate, then to metal, or even to finished goods so that they have higher

value. Downstreaming in general is an advancing product from mineral ores to concentrates and metals.

In general, the government's downstream program since 2020 has succeeded in increasing the added value of the nickel industry in Indonesia. This downstream program is actually a continuation or increase in the capacity of previously existing smelters. Before the ban on mineral exports, Indonesian nickel exports were dominated by ore and concentrate. The export ban on ores and concentrates occurred in 2015-2016 as an implementation of the Mineral and Coal Law Number 4 of 2009 which has been effective since 2014. In 2016, export permits were issued again because many companies were not ready. The ban will be implemented again in 2020. The following graph presents information on shifts in the value and volume of Indonesian nickel exports from 2014 to 2019.

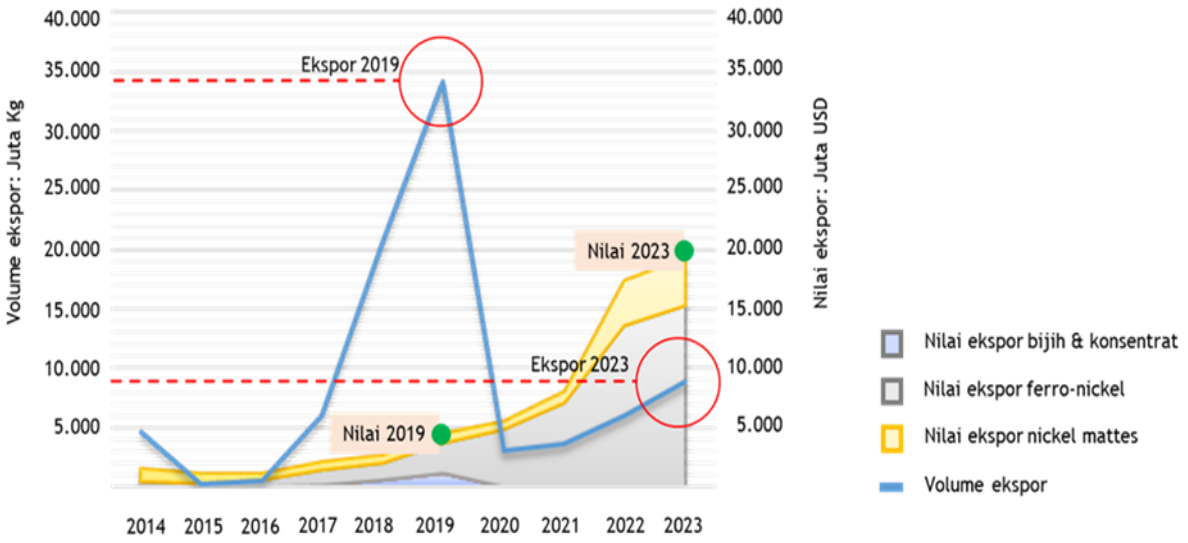

Figure 5 Combined graph of value per product and total export volume (ore, ferronickel, matte) of Nickel for 2014 - 2023 (processed from: National Export Import Data - Central Statistics Agency. https://www.bps.go.id/id/exim)

The export value since the beginning of the 2014 data has been dominated by sales of ferronickel and mattes, and the sales value of the ore is not visible in the graph because it is too small. On the other hand, export volume is dominated by ore so the total sales value is low. In 2019 for example, total sales reached 34 million metric tons, but the value was less than 5 million US dollars. When exports are dominated by ferronickel and mattes, the value increases, such as in 2023 which will reach 20 million US dollars with an export volume of less than 10 million metric tons. This shows that downstream product improvements can increase economic added value significantly.

To increase the economic added value of the nickel industry, we recommend upgrading products from ferronickel and mattes to semi-finished materials or even usable finished goods. We recommend that nickel downstreaming continue into nickel industrialization. In 2022, around 97% of Indonesia's nickel downstream products will be exported to China (Basri, 2024) and become raw materials for industrialization in the country. We recommend that the nickel raw material be processed domestically by building an advanced nickel industry. Indonesia can then export semi-finished goods or even finished products with much greater added economic value.

2.3 Competitive Advantage

According to (Cambridge Dictionary), comparative advantage is the ability of a country to produce goods and services more efficiently (cheaper or of higher quality) than other countries. From the consumer's perspective, comparative advantage is the relative competitiveness of a product against other products (from abroad), so that there is enough reason for them to choose that product over the others.

To compete abroad, a product only needs to have one side of competitiveness, for example only being cheaper or having better quality (relative competitiveness), and it is not necessary to have both, for example being both cheaper and higher quality (absolute competitiveness). If a country naturally has absolute competitiveness, for example, it can produce goods that are cheaper and of higher quality, then that country has the opportunity to increase costs or reduce quality so that it can gain greater profits. Maintaining absolute competitiveness actually causes the country to lose opportunities to gain greater profits.

Indonesian nickel has at least two significant natural comparative advantages, namely:

1. Abundant Reserves

As of the end of 2023, Indonesia holds at least 55 million tons (42.3%) of the world's 130 million tons of nickel reserves. About half of the world's nickel will also be produced in Indonesia by 2023. According to the Ohlin-Heckscher theory of comparative advantage, resource abundance itself is a comparative advantage, where countries with abundant resources tend to produce more efficiently than other countries. (Ohlin, 1933).

2. The Archipelago Nation

An archipelago also provides a natural comparative advantage for Indonesia in terms of transportation costs. To this day, sea transportation is the most efficient means of transportation in the world. In the mining industry, transportation is a significant cost component so efficiency in the transportation sector can provide an important comparative advantage.

The two natural comparative advantages above are actually enough to make Indonesian nickel competitive in the global market. Unfortunately, the Indonesian government still "lacks

confidence" so it tries to gain another comparative advantage, in the form of "low prices". As stated above, the Indonesian government provides very large incentives, even too excessive, such as tax holidays, royalty discounts, exemption from imports of capital goods, coal subsidies, low environmental standards, cheap labor wages, and so on, so that nickel production costs in Indonesia becomes very cheap, in order to attract foreign investment. With the two natural comparative advantages above, then coupled with incentives that make production costs very cheap, Indonesian nickel has an "almost absolute advantage". This then causes over-investment, over-production, and ultimately destroys the world market balance.

As explained above, the production costs incurred by the company become an added value for the area where the company operates. Cheap production costs provide little added value while expensive production costs provide large added value. Thus, making production costs cheap will reduce economic added value. The two natural comparative advantages above are actually enough to make Indonesian nickel competitive in the global market. Inducing other comparative advantages, such as low costs, will actually reduce the added economic value further.

The two natural comparative advantages above are actually sufficient to enable nickel companies to operate in Indonesia, both local and foreign, to compete fairly in the world. If they are still unable to compete, it means that these companies may not be credible. This means that Indonesia makes the wrong selection, opening the door for smelter companies that are not credible and not efficient to operate in Indonesia.

Therefore, we recommend that the Indonesian government revoke all incentives, both direct and indirect. Indonesia's two natural comparative advantages, namely abundant resources and its archipelagic country, are enough to make Indonesian nickel products compete in the global market in a healthy manner. We do not need to reduce production costs to pursue other comparative advantages which will, actually, reduce the economic added value, which is the main objective of downstreaming.

Shifting global environmental standards: towards a new era

In recent decades, environmental awareness has generally increased throughout the world. This awareness then shapes more environmentally friendly behavior. According to Goodwin & Dender Goodwin & Dender (2013) combustion cars have passed their peak in industrialized countries. The downward trend has started to occur (Hopkins, 2016). In China, industrial agents are starting to switch to more environmentally friendly transportation systems (Fu, et al., 2020).

Environmental awareness also influences consumption behavior, where consumers prefer environmentally friendly products or "green consumption". This increasing trend in green consumption behavior ultimately influences the company behavior (Liu, Anderson, & Cruz,

2012). In business, the consumer is king. The company will provide whatever consumers ask for. When consumers want greener and more sustainable products, companies will provide them. According to Gadenne, Kennedy, & McKeiver (2009), in general, the rise in environmental awareness globally has led companies around the world to raise ESG standards. An empirical survey by Rau & Yu (2024) recently showed that corporate adoption of better ESG standards is occurring around the world.

In short, the global community is increasingly aware of the impact of industry on the environment and health. This has given rise to demands for more environmentally friendly products and practices. Developed countries are tightening regulations regarding greenhouse gas emissions, air pollution, and hazardous waste management. Stricter emissions standards and ecological labeling requirements are becoming commonplace. Consumers are increasingly selective in choosing environmentally friendly and sustainably produced products. Companies that do not meet environmental standards risk losing market share and reputation. Currently and in the future, "environmentally friendly" has been and will be an important point in comparative advantage, where environmentally friendly products will be considered more competitive compared to products that are not environmentally friendly.

We need to pay attention to global trends to determine comparative advantage strategies in the downstream nickel industry. The Indonesian government's choice to use cheap and environmentally unfriendly fossil energy as a comparative advantage is actually in the opposite direction of global trends. The space for products that are not environmentally friendly will narrow and lose competitiveness in the future.

The use of cheap, dirty energy, in downstreaming is detrimental in two ways at once, namely:

1. Cheap dirty energy and low environmental standards (and ESG standards in general) lead to industrial ecosystems with low production costs and ultimately low economic added value.
2. Cheap dirty energy and low environmental standards (and ESG standards in general) cause Indonesia to lose an increasingly important green competitiveness in the future.

Therefore, we recommend that the Indonesian government follow global trends by raising ESG standards higher. The government needs to ban the use of fossil energy in the nickel industry, increase labor wages, raise safety standards, and raise ESG standards in general. This general increase in ESG standards will benefit us in two ways at once:

1. Higher ESG standards will increase production costs, thereby increasing economic added value in the nickel and other mineral industries.

2. Higher ESG standards will increase the comparative advantage of nickel products in the global market, where environmentally friendly will become the new standard in the world market.

Case example: ***When large companies choose the neighboring countries, instead***

Tesla chose Malaysia to build an EV factory in Southeast Asia. Tesla did not choose Indonesia, a country with abundant nickel resources. From Tesla's point of view, Indonesia's comparative advantage of cheap and abundant nickel supplies is not enough. In comparison, Malaysia's comparative advantages of excellent physical infrastructure and regulation are found to be more attractive (Goh, 2023).[2] Another example is Samsung, which is a leading electronics company that is also a consumer of nickel products, preferring to build its factory in Vietnam rather than in Indonesia for more or less the same reasons (Linh, 2017; Antara, 2022). Apple also canceled its investment plans in Indonesia, one of the reasons was the illegal tin mining case, in addition to inadequate infrastructure readiness. (Meliyani, 2024). Tesla, Samsung, and Apple are three of the few leading companies in the world that use high ESG standards and make environmental standards one of their critical comparative advantages.

It is important to realize that nickel products can be traded while infrastructure (including the availability of renewable energy) cannot. When leading companies face two choices between ecosystem (physical and non-physical infrastructure, including the availability of environmentally friendly energy) or nickel resources; they will choose the ecosystem. Since nickel can be imported from abroad, while the ecosystem cannot.

2.4 Market Structure and Natural Resource Sovereignty

Natural monopoly

In 2023, Indonesia has 55 of 130 million tons of world nickel reserves. In the same year, half of the world's nickel production was in Indonesia (USGS, 2024). Nickel is one of the four minerals highly needed in the global energy transition (Boer, Pescatori, & Stuermer, 2024). With these three conditions, Indonesia occupies a position as a natural monopoly in the nickel industry. According to Krugman & Wells (2015) those who monopolize natural resources can control the market to maximize their profits. In short, Indonesia in principle has the power to control the world's nickel supply and market to obtain maximum benefits for the national interest and public welfare. With this position, Indonesia actually does not need an investment booster. The government can aim

[2] Another reason according to Neumann (2023), *Managing Director of the American Chamber of Commerce in Indonesia, Tesla chose Malaysia because he objected to local content regulations in Indonesia.*

for high ESG standards, including the use of clean energy, avoiding cheap wages, and so on. Then, production costs increase, and ultimately increase economic added value. This is economically possible as the world nickel market will naturally adjust.

When a natural monopoly is controlled by a private company, it can maximize its (individual) profits at the expense of consumers or the public. This could harm the public interest. In contrast, when the natural monopoly is controlled by the government (which represents the public), then the government can maximize the gains for the public or welfare. As conveyed by Krugman & Wells (2015), the ideal natural monopoly is controlled by the government which represents the public in achieving optimal benefits and welfare for the society.

Sovereignty of natural resources

Indonesia's policy to ban nickel's export and downstreaming are an attempt to gain sovereignty over its resources. Sovereignty over natural resources is in accordance with the principles stipulated in the 1945 Constitution regarding control of the land and state assets for the benefit of society, and the UN resolution on Permanent Sovereignty (UN, 1962) which states that a country has the right to take full action regarding their natural resources, in the best interests of their national development and the welfare of its people. The UN resolution even states that the welfare of the people should be above individual interests, both domestic and foreign entities.

These ideals were then stated more clearly in Law No. 4 of 2009 (Presiden Republik Indonesia, 2009) which underlies the decision to ban exports and industrial downstreaming, as in the following quote:

"Considering (a) that minerals and coal contained in the Indonesian mining jurisdiction are non-renewable natural resources. It is a gift from God Almighty which have an important role in fulfilling the livelihood needs of many people, therefore their management must be controlled by the State to provide added value in a tangible way for the national economy in an effort to achieve prosperity and welfare of the people in a fair manner."

In the same law, part of CHAPTER III concerning Control of Minerals and Coal, Article 4 (1), is stated more explicitly as follows:

"*Minerals and coal as non-renewable natural resources are national wealth controlled by the state for the greatest welfare of the people*."

The quote above emphasizes that the main goal of controlling natural resources is for the prosperity of the people. However, as discussed in the introductory part of this research, this goal is not achievable when most of the added economic value resulting from nickel downstreaming

is enjoyed by companies and foreign workers only. The communities, and the public, cannot enjoy the benefits of increased export, while the state bears the burden of excessive incentives.

Indonesian Influence at the global Nickel market – A General Review

Since the implementation of the downstream policy, Indonesia's nickel production has had a significant impact on world nickel prices. The reason is the large capacity of Indonesia's nickel production, which currently reaches around half of the world's production capacity, and continues to increase. As seen in the table below, world nickel prices rose significantly after the Indonesian government banned nickel ore exports in early 2020. However, this trend reached a turning point when Indonesia's nickel production increased rapidly, which in 2023, reached around 1.8 million tons, or around half of the world's production volume. World nickel prices reached a turning point.

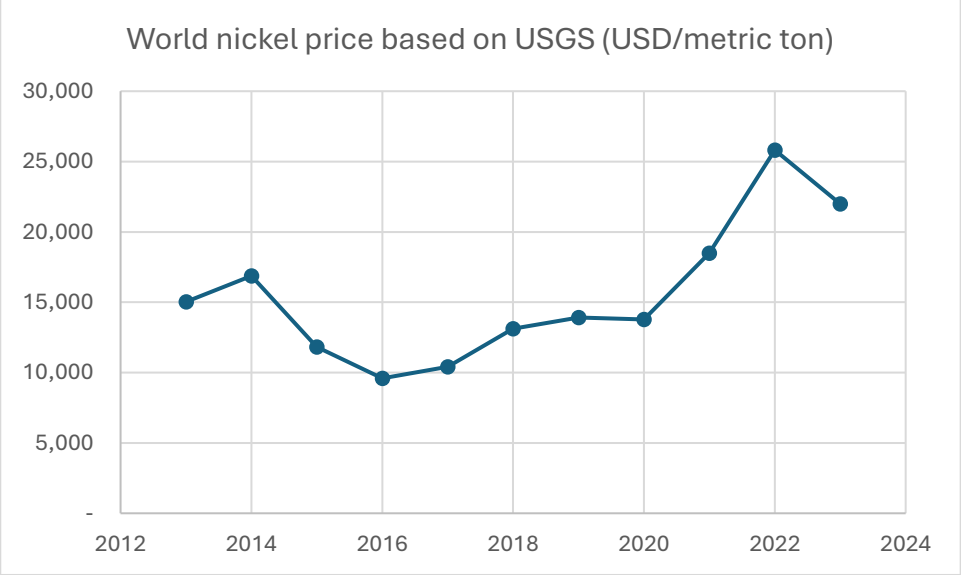

Figure 6 World nickel prices based on USGS (2024)

Apart from oversupply, the decline in global nickel prices was also caused by cheap production costs, especially in Indonesia. This lower price is, among other things, due to the use of coal in the smelting process, which is cheap and subsidized by the government, as well as excessive incentives in various aspects of the business, low work safety standards and wages, and lax obligations related to AMDAL (Environmental standards). According to the Australian government, specifically, the low selling prices were a result of low ESG standards (Ministers for the DISR, 2024).

Cheap production costs cause Indonesian nickel to dominate the world (nickel) market and displace its closest competitors such as Australia. However, on the other hand, low production costs decrease the economic added value of the nickel industry in Indonesia, which is

the main goal of downstreaming. Indirectly, Indonesia provides incentives and subsidies to the world's downstream nickel industry, at the cost of reducing added value in Indonesia. And since most Indonesian nickel products are exported to China, in principle, Indonesia subsidizes the downstream nickel industry in China. Here we can see how China gains double benefits from cheap investment and cheap products from Indonesia.

Thus, sovereignty over nickel has not been achieved yet because the people's optimal prosperity from nickel resources has not been achieved. Furthermore, the government also often bears reputational risks with a lot of criticism from abroad; including in the form of demands from the European Union through the WTO regarding export bans that are considered to disrupt market structures, and the FTA negotiation process with the United States which was opposed by the Senate because it was considered dependent on Chinese investment and did not have good ESG standards (Cramer, et al., 2023). Criticism also came regarding the Indonesian government's intention to establish an organization of nickel-producing countries which was considered anti-free trade behavior (Cramer, et al., 2023).

The increase in smelter investment has not had much effect on increasing regional consumption aggregates. This is an important indicator that the economic added value of the smelter industry in the local economy is not as great as it is promoted. Many studies have shown that a very large portion of the business-added value flows back to China. The externalities are actually borne by the government through lost tariff revenue, taxes, visas, and subsidy burdens, and borne by the community who lose access to a decent living due to pollution, and biodiversity damage, and are displaced from the labor market, especially by foreign workers.

Stages toward permanent sovereignty over natural resources

Achieving the ideal prosperity can be done by implementing the principle of permanent sovereignty comprehensively. The focus is directed at the added value of the national economy by relying on existing natural comparative advantages. Added value to the national economy can be obtained by implementing high ESG standards, including the use of renewable energy sources, increasing community involvement, free from dependence on the extractive economy, as well as waste processing and environmental rehabilitation. Added value can also be increased by removing financial and non-financial incentives, and removing subsidies, and the like. In the aspect of community involvement, wage and work safety regulations can be improved.

Comparative geographical advantages such as the abundant availability of solar and geothermal energy also need to be utilized in increasing the added value of the national economy in nickel downstreaming. The use of renewables in the mining and processing industry, for example, will increase the level of product (ESG) standards and help push Indonesian nickel to

achieve premium prices for "clean" products. Further implementation of the green industry through electricity generated from renewables, implementation of energy management, waste processing, and CCS schemes, also makes existing nickel mining and downstreaming more labor intensive.

The increase in standards will generally increase production costs and also increase investment value. The increase in production costs and investment value will directly benefit Indonesia because it will increase economic added value and the amount of incoming investment. As the dominant producer, the increase in nickel production costs in Indonesia will increase the world nickel price. So, the increase in production costs at the industrial level will be covered by the increase in the selling price. The Indonesian economy gets better economic added value, while investors do not lose profit margins. Counterintuitively, investors will actually get their business bigger in size. They will also get a better reputation. So, in general, all economic entities in Indonesia, both the public, government, and investors, will be better off.

How Indonesia can positively influence the world's Nickel price reference

Indonesia's large and low-cost nickel production volumes are driving down world nickel prices. The problem is that low-cost nickel from Indonesia uses relatively low environmental standards and high emissions. These low-cost and high-emission nickel products are shifting the dominance of nickel products with high costs and higher environmental standards.

Several smelters operating in industrialized countries with relatively high standards and costs are struggling to compete with low-cost nickel with large volumes from Indonesia. Analysts project that high-cost smelters in industrialized countries will vanish if they do not adapt. BHP & Wyloo, two mine and smelter operators in Australia, announced that they are temporarily suspending their operations due to a 45% decline in nickel prices in the past year (Puspadini, 2024).

Another alternative is that high-cost smelters must be able to develop market differentiation by creating "green nickel" products at premium prices. Green nickel is nickel that is produced with high standards and low emissions so that it can enjoy premium prices (Russell, 2024). Currently, these giant companies are trying to lobby the governments of North American and European countries to provide incentives for green nickel products or inhibit dirty nickel products. Nickel has also been included in critical minerals so that it can access critical mineral funding of up to 40 billion dollars (Ministers for the DISR, 2024). If this differentiation is successful, there will be two nickel products in the world, namely, regular nickel and green nickel. Regular nickel is produced at a low cost, with low standards, and high-emissions, and thus has a cheaper market price. Meanwhile, green nickel is produced at a relatively expensive cost, with high standards, low emissions, and thus a more expensive market price. Indonesia's low-cost

nickel industry will fill the regular market and the nickel industry with higher standards will fill the premium market. In terms of economic added value, based on the explanation above, premium-priced green nickel has a greater industrial-added value than regular nickel.

The shift in the world nickel market in recent years indicates that the Indonesian nickel industry has indirectly dominated and determined the direction of the global nickel market. Indonesian is, in principle, a "trendsetter" in the world nickel market (Redaksi VOI, 2024; Home, 2024). Unfortunately, the Indonesian nickel industry is moving towards a production system that is not environmentally friendly and has low added value.

We recommend that the Indonesian government change the direction of the nickel industry to greener, high-standard products, with premium prices, and higher economic added value as well. The Indonesian government's choice of green nickel will direct the world nickel market to premium and environmentally friendly products. The Indonesian government's choice will be a trend setter in the world nickel market. This will benefit Indonesia on two sides at once. First, the added value of the nickel industry will be greater and its role in economic growth will also be greater. And second, the impact of environmental damage on the nickel industry will be lower. Meanwhile, the world in general will benefit because green nickel will become the world nickel standard.

Maintaining Indonesia's Nickel Market Dominance

Australian financial industry practitioners predict that Indonesia will dominate world nickel production by 60% in 2028, while global market demand will increase by 2 million metric tons in a decade in 2030 (Treadgold, 2021). The 60% share is still considered moderate considering that Indonesia has competitiveness in terms of cheap transportation costs due to its archipelagic state.

Indonesia's nickel dominance in the global market will make investment in Indonesia financially profitable and will always be attractive to investors, both foreign and domestic. On the other hand, increasing ESG standards will also help achieve the target of reducing carbon emissions and NZE 2060. Achieving these targets will directly help increase Indonesia's economic development because it also promotes 'clean' products whose markets are still growing (IEA, 2022).

3 Recommendation

From the analysis of the two policies above, we promote 5 recommendations:

1. **Remove all smelter investment incentives, both direct and indirect, and return to normal policies.**

As mentioned above, smelter investment incentives are one of the main causes of excessive investment and excessive production. It ruins the balance of the global nickel market. Apart from that, incentives also cause a loss of government's income, in terms of taxes and royalties as well as increasing the cost of coal subsidies for the smelter industry.

Removing incentives could return the market to its natural balance and improve the world's nickel prices. Removing incentives will also restore government income and eliminate the burden of coal subsidies coming from the smelter industry. Therefore, the state can restore lost added value in the national economy.

2. Enhance ESG standards, including a ban on the use of fossil energy.

To increase economic added value and at the same time reduce negative impacts on the surrounding environment, we recommend improving the ESG standards in general for all smelter industries. Enhancing ESG standards includes improving general environmental standards, banning the use of fossil energy (especially coal), having a better social standard such as increases in wages and worker welfare, safety standards, nurturing the relations with surrounding communities, and improving governance standards.

As stated above, the use of fossil energy in the downstream mineral industry is the cause of incoherency between the downstreaming policy and the NZE program. If fossil energy is eliminated and replaced with renewable energy as well as higher environmental standards, then these two prominent and essential programs can finally be coherent, not interfering with each other, and even support each other.

The increase in environmental, social, and governance standards in general will increase smelter production costs in Indonesia. This increase in production costs will increase the money circulation in the mineral industry ecosystem, increase the income of economic agents, and ultimately increase the added value of the economy as a whole. In addition, an increase in standards (which causes an increase in costs), will naturally put a brake on the current excessive production volume rate (and could even reduce it) thereby bringing the nickel market back into its balance.

President Jokowi himself, in an interview with Reuters, once said that he would increase supervision and ESG standards in the nickel mining and smelting industry, including only allowing investment in smelters that utilize renewable energy (Suroyo, 2023).

3. In case the two recommendations above are not sufficient to restore market balance, Indonesia can add export taxes, or export tariffs, or royalties.

In principle, incentives and taxes have opposite functions. Incentives can reduce costs (prices) and increase production while taxes can increase costs and reduce production. If the

removal of incentives is not enough to increase prices, put a brake on production, and eventually reach a balance in the world nickel market, then the government can add export taxes, or export tariffs, or royalties.

4. As a critical and non-renewable natural resource, nickel extraction must use the thrifty principle.

In economics, renewable and non-renewable natural resources are treated differently. In order for non-renewable natural resources to be of optimal use, we must conserve their use so that they remain available for a very long time. In economics, this concept is called optimal extraction of nonrenewable resources (Pindyck, 1978; Deshmukh & Pliska, 1980). Nickel is also one of the 4 most critical minerals and could even be a bottleneck in the global energy transition (Boer, Pescatori, & Stuermer, 2024). Excessive nickel extraction will deplete nickel reserves more quickly and will be detrimental to Indonesia as well as the world in the long term and could even hinder the global energy transition.

The Indonesian government must treat nickel accordingly, as a highly valuable natural resource and only utilize nickel for products that are essential with high economic value. For example, in the electric car industry, nickel is only used for premium cars or long-hauling vehicles. For regular electric cars, we can use other cheaper materials and more abundant in nature. In this way, the use of nickel shall be more efficient and effective. This will benefit Indonesia because nickel prices are maintained. Furthermore, having a sustainable nickel resource benefits the whole world.

5. Enhance nickel downstreaming into nickel industrialization

To increase economic added value at an advanced stage, the government needs to improve downstreaming to industrialization by increasing products from ferronickel and mattes to semi-finished metal or even finished goods. In 2022, around 97% of Indonesia's downstream nickel products will be exported to China as an industrial raw material in that country. We recommend that the nickel raw material be processed domestically by building an advanced nickel industry.

List of References

Agora Industry. (2023, June 15). *The global steel industry can achieve net-zero emissions by the early 2040s*. Retrieved from Agora Industry: https://www.agora-industry.org

Annur, C. M. (2024, February 13). *Indonesia Kantongi Cadangan Nikel Terbesar Global pada 2023*. Retrieved from Databox: https://databoks.katadata.co.id

Antara. (2022, Februari 17). *Samsung investasikan Rp13,1 triliun untuk ekspansi pabrik di Vietnam.* Retrieved from Antara: https://www.antaranews.com/berita/2708973/samsung-investasikan-rp131-triliun-untuk-ekspansi-pabrik-di-vietnam

AP3I. (2021, June 28). *Pengusaha Nikel Dukung Usulan Pembatasan Proyek Smelter*. Retrieved from Asosiasi Perusahaan Industri Pengolahan dan Pemurnian Indonesia (AP3I): https://www.ap3i.or.id

APNI. (2021, June 29). *APNI Minta Penjualan Bijih Nikel Dibatasi, Kenapa?* Retrieved from Media Nikel Indonesia: https://nikel.co.id

Basri, F. (2024). Nickel Downstreaming: For Whom? *Presentation.* Jakarta.

Boer, L., Pescatori, A., & Stuermer, M. (2024). Energy Transition Metals: Bottleneck for Net-Zero Emissions? *Journal of the European Economic Association, 22*(1), 200–229. doi:10.1093/jeea/jvad039

Boer, R., Dewi, R. G., Siagian, U. W., Ardiansyah, M., Sunkar, A., Budiharto, & Ratnasari. (2021). *Indonesia Third Biennial Update Report.* Jakarta: Ministry of Environment and Forestry Republic of Indonesia. Retrieved from http://www.ditjenppi.menlhk.go.id

BPS. (2024, May 15). *Proporsi Nilai Tambah Sektor Industri Manufaktur Terhadap PDB.* Retrieved from Badan Pusat Statistik: https://www.bps.go.id

Cambridge Dictionary. (n.d.). *Comparative advantage.* Retrieved from Cambridge Dictionary: https://dictionary.cambridge.org

Cleeve, E. (2008). How Effective Are Fiscal Incentives to Attract FDI to Sub-Saharan Africa? *The Journal of Developing Areas, 42*(1), 135-153. Retrieved from https://www.jstor.org

CNN Indonesia. (2023, August 12). *Staf Luhut Ungkap Hanya 2 Perusahaan Nikel Terima Tax Holiday*. Retrieved from CNN Indonesia: https://www.cnnindonesia.com

Cramer, K., Smith, T., Baldwin, T., Fetterman, J., Brown, S., Manchin III, J., . . . Cassidy, B. (2023, Oktober 25). *Concerns Regarding a Potential Critical Minerals Trade Agreement.* Retrieved from Kevin Cramer U.S. Senator for North Dakota: https://www.cramer.senate.gov

Databox. (2016, October 20). *Akhir 2016, Kapasitas Smelter Indonesia Naik 54%*. Retrieved from Databox: https://databoks.katadata.co.id

Deshmukh, S. D., & Pliska, S. R. (1980). Optimal Consumption and Exploration of Nonrenewable Resources under Uncertainty. *Econometrica, 48*(1), 177-200. doi:10.2307/1912024

ESDM. (2022, September 1). *Transisi Energi Butuh Biaya Besar, Pemerintah Ajak Pebisnis Investasi*. Retrieved from ESDM: https://www.esdm.go.id

Fu, L., Sun, Z., Zha, L., Liu, F., He, L., Sun, X., & Jing, X. (2020). Environmental awareness and pro-environmental behavior within China's road freight transportation industry: Moderating role of perceived policy effectiveness. *Journal of Cleaner Production, 252*, 119796. doi:10.1016/j.jclepro.2019.119796

Gadenne, D. L., Kennedy, J., & McKeiver, C. (2009). An empirical study of environmental awareness and practices in SMEs. *Journal of Business Ethics, 84*, 45-63. doi:10.1007/s10551-008-9672-9

Goh, N. (2023, July 20). *Tesla becomes latest EV company to see promise in Malaysia.* Retrieved from Nikkei Asia: https://asia.nikkei.com/Business/Automobiles/Tesla-becomes-latest-EV-company-to-see-promise-in-Malaysia

Goodwin, P., & Dender, K. V. (2013). 'Peak Car' — Themes and Issues. *Transport Reviews, 33*(3), 243-254. doi:10.1080/01441647.2013.804133

Home, A. (2024, Mei 30). *LME brand approval cements Indonesian nickel ascendancy*. Retrieved from Reuters: https://www.reuters.com

Hopkins, D. (2016). Can environmental awareness explain declining preference for car-based mobility amongst generation Y? A qualitative examination of learn to drive behaviours. *Transportation Research Part A: Policy and Practice, 19*, 149-163. doi:10.1016/j.tra.2016.08.028

IEA. (2022). *An Energy Sector Roadmap to Net Zero Emissions in Indonesia.* France: International Energy Agency.

IESR. (2021). *Deep decarbonization of Indonesia's energy system: A pathway to zero emissions by 2050.* Jakarta: IESR. Retrieved from https://iesr.or.id

Islami, M. I., & Hastiadi, F. F. (2020). Nature of Indonesia's Deindustrialization. *Economics Development Analysis Journal, 9*(2), 220-232. doi:10.15294/edaj.v9i2.38016

Jansen, K. (1995). The macroeconomic effects of direct foreign investment: The case of Thailand. *World Development, 23*(2), 193-210. doi:10.1016/0305-750X(94)00125-I

JETP Indonesia. (2023). *Comprehensive Investment Policy Plan.* Jakarta: JETP Indonesia. Retrieved from https://jetp-id.org/cipp

Kementerian ESDM. (2021, Oktober 8). *Ini Prinsip dan Peta Jalan Pemerintah Capai Net Zero Emission.* Retrieved from Kementerian ESDM: https://www.esdm.go.id

Kementerian ESDM. (2023, October 19). *Pemerintah Rencana Batasi Izin Pembangunan Smelter Nikel Kelas II*. Retrieved from Kementerian ESDM RI: https://www.esdm.go.id

Kementerian ESDM. (2024, Januari 19). *RPP Kebijakan Energi Nasional Ditargetkan Selesai Juni 2024.* Retrieved from Kementerian ESDM: https://www.esdm.go.id

Krugman, P., & Wells, R. (2015). *Economics* (4th ed.). New York: Worth Publishers.

Landefeld, J. S., Seskin, E. P., & Fraumeni, B. M. (2008). Taking the Pulse of the Economy: Measuring GDP. *Journal Of Economic Perspectives, 22*(2), 193-216. doi:10.1257/jep.22.2.193

Linh, D. T. (2017, October 02). *Samsung's Investments in Vietnam: Reasons and Consequences.* Retrieved from Congthuong: https://tapchicongthuong.vn/bai-viet/samsungs-investments-in-vietnam-reasons-and-consequences-49598.htm

Liu, Z., Anderson, T. D., & Cruz, J. M. (2012). Consumer environmental awareness and competition in two-stage supply chains. *European journal of operational research, 218*(3), 602-613. doi:10.1016/j.ejor.2011.11.027

LPEM. (2024). *Indonesia Economic Outlook Triwulan 1 2024.* Jakarta: LPEM FEB UI. Retrieved from https://lpem.org

Meliyani, E. (2024, April 28). *Dianggap Belum Siap, Apple Batalkan Investasi 1,6 Triliun di Indonesia*. Retrieved from Tech: https://tech.indozone.id

Ministers for the DISR. (2024, Februari 16). *Nickel placed on critical minerals list*. Retrieved from Ministers for the Department of Industry, Science and Resources: https://www.minister.industry.gov.au

Muliawati, F. D. (2023, August 9). *Cadangan Nikel RI Sekarat, Ini Biang Keroknya*. Retrieved from CNBC Indonesia: https://www.cnbcindonesia.com

Neumann, A. L. (2023, August 1). *Tesla's move into Malaysia should be a wake-up call for Indonesia.* Retrieved from Nikkei Indonesia: https://asia.nikkei.com

Ohlin, B. (1933). *Interregional and International Trade* (39 ed.). Cambridge: Harvard University Press.

Parapat, J., & Hasan, K. (2023). *Emerging captive coal power: Dark clouds on Indonesia's clean energy horizon.* Jakarta: CREA and GEM. Retrieved from https://energyandcleanair.org

Pindyck, R. S. (1978). The Optimal Exploration and Production of Nonrenewable Resources. *Journal of Political Economy, 86*(5), 841-861. Retrieved from https://www.jstor.org

Presiden Republik Indonesia. (2009, Januari 12). *Undang-Undang Republik Indonesia Nomor 4 Tahun 2009 tentang Pertambangan Mineral dan Batubara.* Retrieved from Database Peraturan JDIH BPK: https://peraturan.bpk.go.id/Details/38578

Puspadini, M. (2024, January 23). *Harga Ambles, BHP & Wyloo Hentikan Operasi Tambang Nikel di Australia*. Retrieved from CNBC Indonesia: https://www.cnbcindonesia.com

Putri, C. A. (2023, January 20). *Tarik Devisa Hasil Ekspor Balik ke RI, Ini Aksi BI.* Retrieved from CNBC Indonesia: https://www.cnbcindonesia.com

Rahman, A. A., Mahardika, H., Putri, A. A., & Rosifah, S. N. (2024). *Standar Keekonomian dan Keadilan untuk Penutupan Dini PLTU.* Jakarta: Transisi Bersih. Retrieved from https://transisibersih.org/

Rau, P. R., & Yu, T. (2024). A survey on ESG: investors, institutions and firms. *China Finance Review International, 14*(1), 3-33. doi:10.1108/CFRI-12-2022-0260

Redaksi VOI. (2024, Juni 10). *Bos IMIP Sebut CNGR Pantas Tembus Bursa London Metal Exchange*. Retrieved from VOI: https://voi.id

Republic of Indonesia. (2022). *Enhanced Nationally Determined Contribution Republic of Indonesia.* Jakarta: Republic of Indonesia. Retrieved from https://unfccc.int

Russell, C. (2024, Februari 19). *Australia gives nickel a quick fix, but surgery of global industry needed*. Retrieved from Reuters: https://www.reuters.com

Shiddiq. (2023, October 16). *Saat ini Sudah Ada 37 Smelter Beroperasi di Indonesia*. Retrieved from Media Nikel Indonesia: https://nikel.co.id

Simanjuntak, U., & Hasjanah, K. (2023, Oktober 18). *Upaya Memperkuat Komitmen Transisi Energi Indonesia-Tiongkok dalam Kerjasama BRI*. Retrieved from IESR: https://iesr.or.id

Suroyo, G. (2023, March 13). *Exclusive: Indonesian president pledges nickel mining clean up amid EV-led boom*. Retrieved from Reuters: https://www.reuters.com

Treadgold, T. (2021, Juni 2). *Indonesia On Track To Dominate The Supply Of Nickel To Make Batteries*. Retrieved from Forbes: https://www.forbes.com

UN. (1962, December 14). *Permanent Sovereignty over Natural Resources General Assembly Resolution 1803 (XVII) New York, 14 December 1962.* Retrieved from Audiovisual Library of International Law: https://legal.un.org

UNCTAD. (1999). *Trade And Development Report.* Geneva: UNCTAD. Retrieved from https://unctad.org

UNCTAD. (2002). *Trade And Development Report.* Geneva: UNCTAD. Retrieved from https://unctad.org

USGS. (2024). *Nickel Statistics and Information*. Retrieved from USGS: https://www.usgs.gov

USGS. (2024). *U.S. Geological Survey, Mineral Commodity Summaries, January 2024.* Virginia: USGS. Retrieved from https://pubs.usgs.gov

Van-Parys, S., & James, S. (2010). The effectiveness of tax incentives in attracting investment: panel data evidence from the CFA Franc zone. *International Tax and Public Finance, 17*, 400–429. doi:10.1007/s10797-010-9140-1

Wahyudi, N. A. (2023, May 8). *Pemerintah Cabut Tax Holiday Smelter Nikel RKEF Baru*. Retrieved from Bisnis: https://ekonomi.bisnis.com

Wells, L. T., Allen, n. J., Morisset, J., & Pirnia, N. (2001). *Using Tax Incentives to Compete for Foreign Investment Are They Worth the Costs?* Washington DC: The World Bank. doi:10.1596/0-8213-4992-9